

**GEOTECHNICAL ENGINEERING EVALUATION
LIMITED SERVICES
PROPOSED AARON'S FURNITURE
200 UNION STREET
LYNN, MASSACHUSETTS**

04-0412 S May 13, 2004

PREPARED FOR:

Georto, Inc.
Attention: Mr. James Hawkins
2980 McFarlane Road, Suite 202
Miami, FL 33133

PREPARED BY:



Attention: Chad B. Michaud, P.E.
Geotechnical Engineer
350 Route 108, Suite 208
Somersworth, NH 03878



• Geotechnical Engineering • Field & Lab Testing • Scientific & Environmental Consulting

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Georto, Inc.
Attention: Mr. James Hawkins
2980 McFarlane Road, Suite 202
Miami, FL 33133

Subject: Geotechnical Engineering Evaluation – Limited Services
Proposed Aaron's Furniture
200 Union Street
Lynn, Massachusetts

1.0 INTRODUCTION

1.1 Scope of Work

In accordance with our Agreement Addendum dated May 05, 2004, we have made a site visit, observed foundation subgrade soils and 5 previously excavated test pits to provide an assessment of existing fill suitability for building and foundation support of the proposed Aaron's Furniture store at 200 Union Street in Lynn, Massachusetts. The contents of this report are subject to the scope outlined in our Agreement, the terms and conditions of that Agreement and the limitations set forth in Attachment A.

1.2 Project Conditions

We understand the building will be on the order of 72 by 104 feet in plan dimensions. The building is proposed to be a one-story structure with slab-on-grade and shallow spread footing foundations. We understand the finish floor elevation of the structure will be at or within 1 foot of the elevation of the adjacent structures and Union Street.

2.1 Site History and Existing Conditions

Our understanding of the site history is based on discussions with Georto, Inc. (project developer) and PM Construction Company (project general contractor). We understand

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the site was formerly occupied by a 5-story brick building that included a basement level. The building was situated directly adjacent to the Union Street sidewalk and was on the order of 80 feet wide along Union Street and 120 feet long from front to back. We understand the building burned and was subsequently demolished following a fire about 2 years ago.

We made a site visit on May 07, 2004 to observe site conditions. We observed an existing concrete basement foundation along the north, west and portions of the southerly former building location. The foundation was observed to be about 10.5 feet tall and included a concrete basement floor slab where exposed in the southeasterly portion of the site. We observed the excavated foundation subgrade soils to be about 4 to 5 feet below site grade. The foundation subgrade in the southeast, northwest and north portions of the proposed structure consisted of black ash, burned wood, bricks with other solid waste debris such as plastic, glass and metal (fill) at subgrade. The foundation subgrade in the east, west and southwest portions of the proposed structure consisted of dark brown silty sand with some organics and bricks (fill). The general proposed floor subgrade soils consisted of similar materials. Additional descriptions and location of subgrade observations are shown on the "Exploration Location Sketch" attached as Sheet 1. Several digital pictures depicting site observations are attached in Appendix A.

2.2 Subsurface Soils

In addition to the excavated foundation subgrade, five test pit explorations were made in the interior of the proposed building. The test pits were excavated and remained open under the direction of PM Construction Company prior to S. W. COLE ENGINEERING, INC.'s site visit. An excavator was not present on site at the time of our visit. The explorations were made to depths of about 10 to 10.5 feet where encountering the existing concrete slab.

Test Pits TP-1 and TP-2 encountered primarily the black ash, burned wood, bricks with other solid waste debris such as plastic, glass and metal. Test Pits TP-3 through TP-5 encountered two primary layers of fill materials. These test pits encountered the black burned materials as observed at TP-1 and TP-2 and a layer of dark brown sandy silt with some clay, organics, brick, glass, plastic and long roots.



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For more information relative to the explorations, please refer to the test pit logs attached as Sheets 2 through 4. A key to the notes and symbols used on the logs is attached as Sheet 5.

Given the site restraints and configuration, test pit explorations were not be performed through the concrete slab to observe underlying soils.

Four test borings were made by GEC in early 2004 as part of a Phase II Environmental Site Assessment. Their report dated February 2, 2004 indicated that "urban fill" was encountered. The two borings made within the footprint of the existing foundation encountered a basement slab at depths of 9 and 10 feet. Logs of these test borings are not available.

2.3 Groundwater

Free groundwater was not observed in the open test pits. Information relative to long-term groundwater conditions is not available.

3.0 EVALUATION AND RECOMMENDATIONS

Based on our observations of the site and open test pit explorations and knowledge of the site history, we anticipate that burned building debris was used to fill the existing concrete basement foundation to the current grade.

It is our opinion that the fill soils (burned materials and dark brown silty sand with various debris) are not suitable for foundation or floor slab support. It is also our opinion the materials are not suitable for re-use as fill, even if replaced in controlled compacted lifts. Based on our experience these soils are highly susceptible to significant settlement under their own weight and new building loads. The materials are also susceptible to decomposition and additional associated settlement created by the voids. We recommend that the fill materials be removed and replaced with a suitable compacted granular borrow.

Although a wide range of soil materials can be used successfully, it has been our experience that granular soils with good drainage characteristics provide significant advantages particularly in wet conditions and during cold weather construction. We



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recommend that granular borrow consist of a mixture of silt, sand and gravel free of organic materials, frozen matter or other deleterious substances. We recommend that fill placed below the building area be placed in horizontal lifts not exceeding 12 inches and be compacted to at least 95 percent of its maximum dry density as determined by ASTM D-1557.

We understand the current site preparation proposal is to remove the fill materials from the basement and replace with new fill and construction of a new spread footing foundation within the interior of the existing foundation. Our current scope of services does not include test boring explorations for evaluation of fill soils (if present) and native site soils below the existing foundation relative to the support of the proposed structure. We understand that project economics requires the existing foundation to remain in place. It must be understood that the native soils have not been explored and it is the recommendation of S. W. COLE ENGINEERING, INC. that this service be undertaken.

We recommend that S. W. COLE ENGINEERING, INC. be retained to provide soils engineering and testing services during the excavation and foundation phases of the project. Services should include subgrade observations, density testing of fill placement and concrete testing.

It has been a pleasure to be of assistance to you with this phase of your project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Very truly yours,

S. W. COLE ENGINEERING, INC.

Chad B. Michaud, P.E.
Geotechnical Engineer



ATTACHMENT A

Limitations

This report has been prepared for the exclusive use of Georto, Inc. for specific application to the proposed Aaron's Furniture store at 200 Union Street in Lynn, Massachusetts. Our services were limited by Georto, Inc. to an assessment of existing fill suitability for support of the proposed structure only and other geotechnical considerations were specifically excluded by Georto, Inc.. Georto, Inc. has agreed to protect and hold harmless S. W. COLE ENGINEERING, INC. from any and all claims, including third-party claims, for damages or consequential damages due services and recommendations not requested. S. W. COLE ENGINEERING, INC. has endeavored to conduct the work in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S. W. COLE ENGINEERING, INC.'s scope of work has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S. W. COLE ENGINEERING, INC. should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S. W. COLE ENGINEERING, INC.

UNION STREET

ING 24" WIDE
RETE FOUNDATION

EXISTING
32" WIDE
CONCRETE
FOUNDATION
WALL

TP-5



12"± WIDE CONCRETE
FOUNDATION WALL
(ABUTTS SIDEWALK)

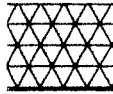
TP-4



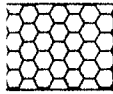
LEGEND



Approximate Test Pit Location



Black Ash, Wood, Bricks
Exposed at Subgrade



Dark Brown Silty Sand
w/some Organics and Bricks
Exposed at Subgrade

APPROXIMATE NORTH



J. COLE
EXISTING BUILDING, INC.

GEORTO, INC.

LOCATION SKETCH

Proposed Aaron's Furniture
200 Union Street
Lynn, Massachusetts

12 S
04

Scale Not to Scale
Sheet 1



PROJECT / CLIENT: PROPOSED AARON'S FURNITURE / GEORTO, INC.

LOCATION: 200 UNION STREET / LYNN, MASSACHUSETTS

PROJECT NO. 04-0412

TEST PIT TP-1			
DATE: 05-07-04		SURFACE ELEVATION: NOT AVAILABLE	LOCATION: SEE SHEET 1
SAMPLE NO.	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		CONCRETE FOUNDATION WALL	
	3' +/-	BROWN SILT AND SAND WITH SOME GRAVEL, CLAY, BRICK, METAL AND WOOD (FILL)	
	10.5' +/-	BLACK BURNED WOOD, BRICKS, MORTAR, CONCRETE, ASH, METAL AND PLASTIC (FILL)	
		CONCRETE FLOOR SLAB	

WEST →

COMPLETION DEPTH: 10.5' +/-

DEPTH TO WATER: NO FREE WATER OBSERVED

TEST PIT TP-2			
DATE: 05-07-04		SURFACE ELEVATION: NOT AVAILABLE	LOCATION: SEE SHEET 1
SAMPLE NO.	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		CONCRETE FOUNDATION WALL	
	10.5' +/-	BLACK BURNED WOOD, BRICKS, MORTAR, CONCRETE, ASH, METAL AND PLASTIC (FILL)	
		CONCRETE FLOOR SLAB	

EAST →

COMPLETION DEPTH: 10.5' +/-

DEPTH TO WATER: NO FREE WATER OBSERVED



TEST PIT LOG

PROJECT / CLIENT: PROPOSED AARON'S FURNITURE / GEORTO, INC.

LOCATION: 200 UNION STREET / LYNN, MASSACHUSETTS

PROJECT NO. 04-0412

TEST PIT <u>TP-3</u>			
DATE: <u>05-07-04</u>		SURFACE ELEVATION: <u>NOT AVAILABLE</u>	LOCATION: <u>SEE SHEET 1</u>
SAMPLE NO.	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
	1' +/-	BROWN SILT AND SAND WITH SOME GRAVEL, CLAY, BRICK, METAL AND WOOD (FILL)	
	2.5' +/-	BLACK BURNED WOOD, BRICKS, MORTAR, CONCRETE, ASH, METAL AND PLASTIC (FILL)	
	10' +/-	CONCRETE FLOOR	
COMPLETION DEPTH: <u>10' +/-</u>		DEPTH TO WATER: <u>NO FREE WATER OBSERVED</u>	

TEST PIT <u>TP-4</u>			
DATE: <u>05-07-04</u>		SURFACE ELEVATION: <u>NOT AVAILABLE</u>	LOCATION: <u>SEE SHEET 1</u>
SAMPLE NO.	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
	4.5' +/-	BLACK BURNED WOOD, BRICKS, MORTAR, CONCRETE, ASH, METAL AND PLASTIC (FILL)	
	10' +/-	DARK BROWN SANDY SILT WITH SOME CLAY, ORGANICS, BRICK, GLASS, PLASTIC AND LONG ROOTS (FILL)	
		CONCRETE FLOOR	
COMPLETION DEPTH: <u>10' +/-</u>		DEPTH TO WATER: <u>NO FREE WATER OBSERVED</u>	

**TEST PIT LOG**PROJECT / CLIENT: PROPOSED AARON'S FURNITURE / GEORTO, INC.LOCATION: 200 UNION STREET / LYNN, MASSACHUSETTSPROJECT NO. 04-0412

TEST PIT <u>TP-5</u>			
DATE: <u>05-07-04</u>		SURFACE ELEVATION: <u>NOT AVAILABLE</u>	LOCATION: <u>SEE SHEET 1</u>
SAMPLE NO.	DEPTH (FT)	STRATUM DESCRIPTION	TEST RESULTS
		BLACK BURNED WOOD, BRICKS, MORTAR, CONCRETE, ASH, METAL AND PLASTIC (FILL)	
	6' +/-		
		DARK BROWN SANDY SILT WITH SOME CLAY, ORGANICS, BRICK, GLASS, PLASTIC AND LONG ROOTS (FILL)	
	10' +/-		
		CONCRETE FLOOR	
COMPLETION DEPTH: <u>10' +/-</u>		DEPTH TO WATER: <u>NO FREE WATER OBSERVED</u>	

SEE SHEET 1



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KEY TO THE NOTES & SYMBOLS

Test Boring and Test Pit Explorations

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

Key to Symbols Used:

W	-	water content, percent (dry weight basis)
q _u	-	unconfined compressive strength, kips/sq. ft. - based on laboratory unconfined compressive test
S _v	-	field vane shear strength, kips/sq. ft.
L _v	-	lab vane shear strength, kips/sq. ft.
q _p	-	unconfined compressive strength, kips/sq. ft. based on pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W _L	-	liquid limit - Atterberg test
W _P	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass. RQD is computed from recovered core samples.
γ _T	-	total soil weight
γ _B	-	buoyant soil weight

Description of Proportions:

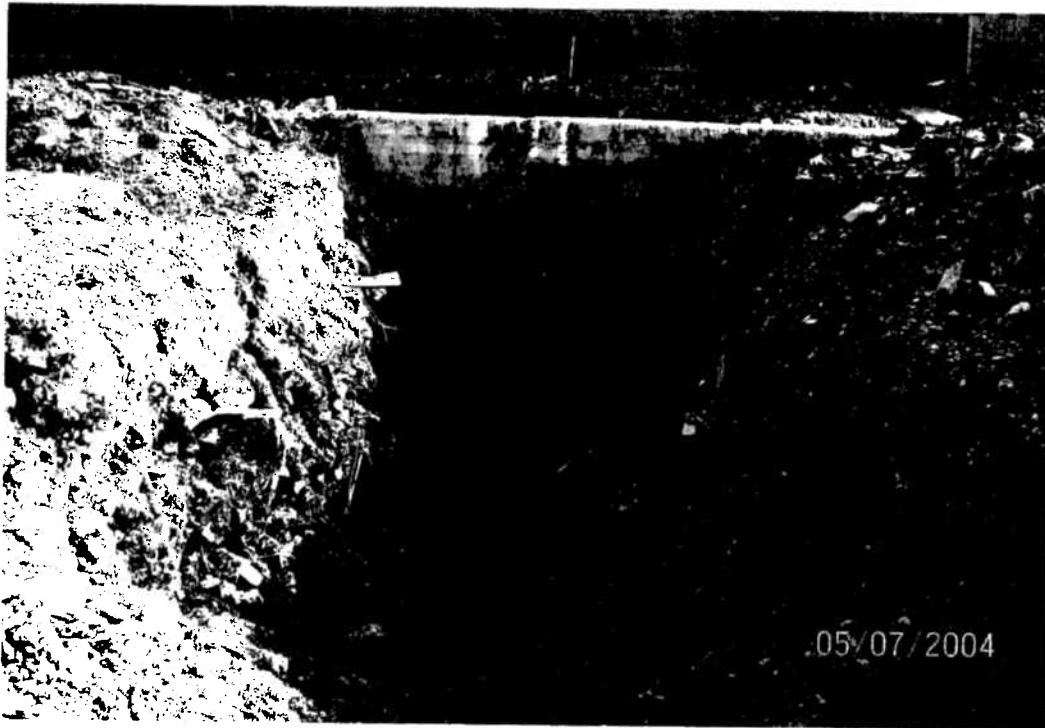
0 to 5% TRACE
 5 to 12% SOME
 12 to 35% "Y"
 35+% AND

REFUSAL: Test Boring Explorations - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

REFUSAL: Test Pit Explorations - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.

APPENDIX A
DIGITAL PICTURES

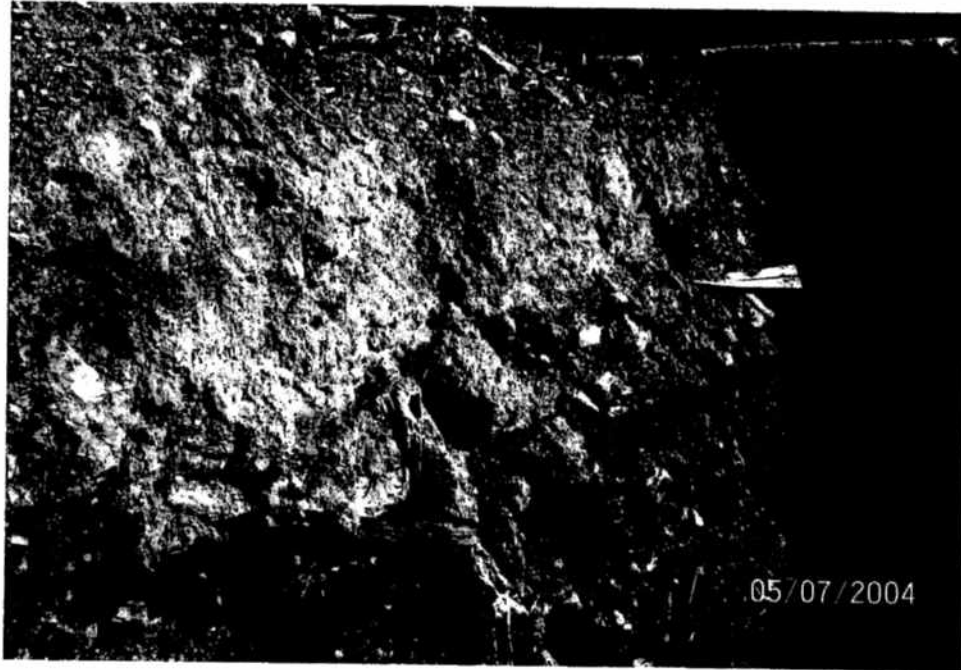


TEST PIT TP-1 (FACING EAST)



TEST PIT TP-1 (FACING SOUTHEAST)

A-1



TEST PIT TP-1 (NORTH SIDEWALL)



TEST PIT TP-2 (FACING NORTHEAST)



TEST PIT TP-3 (FACING SOUTHWEST)



TEST PIT TP-4 (FACING SOUTHEAST)



TEST PIT TP-3 (FACING NORTHWEST)



EAST WALL LINE (FACING SOUTH)

A-4



NORTH WALL LINE (FACING WEST)



NORTHWEST BUILDING CORNER

A-5